NOTES ON THE FLORA OF A GORGE OF ESOPUS CREEK, NEW YORK

HENRY F. DUNBAR

The object of this paper is to record evidence of a changing flora: (1) remnants of a flora of a colder climate which is presumed to have preceded the present time but followed the last glacial period, (2) presence of species characteristic of a warmer climate and which may be the vanguard of a gradual plant migration into this area.

DESCRIPTION OF THE AREA

This study covers the slopes immediately adjacent to Esopus Creek and creek bed, Ulster County, N. Y. from the Ashokan Reservoir to the flood plain at Marbletown. Through most of this area the creek flows rapidly with very little quiet water over a stony or gravelly bottom. The shores, mostly heavily wooded, rise steeply, and, in some places consist of sheer cliffs of Devonian sandstone often 100 ft. high. Frequent sand terraces and gravel bars occur with a flora characteristic of such places. The elevation of the study area lies between 200 and 500 feet above sea level. The average rainfall is about 43 in. per year and the temperature range is from a minimum of –25° F to a maximum of about 100° F.

The predominating trees on the sand, gravel or silt shores are poplars *(Populus deltoides* and *P. grandidentata),* sycamore *(Platanus occidentalis),* and both the gray and speckled alders *(Alnus serrulata* and *A. rugosa).* The steep slopes adjacent to the creek are heavily covered with hemlock and white pine *(Tsuga canadensis* and *Pinus Strobus),* the three birches *(Betula lenta, B. lutea, B. papyrifera),* and the maples *(Acer rubrum, A. saccharum. A pensylvanicum).* On the higher slopes various oaks *(Quercus alba, Q. Prinus, Q. rubra, Q. velutina,* and *Q. coccinea)* complete with the pines and the hemlocks. The more conspicuous shrubs along the shore are the ninebark *(Physocarpus opulifolius)*, the dogwood *(Cornus Amomum)*, and various willows *(Salix spp.)*.

Of outstanding interest is the occurrence of species usually found further north or at higher elevations. Their presence here in cool, shady, moist situations suggests that they may be relics of a time when a colder climate favored their more general distribution. Such a condition doubtless followed the last glacial period, and, as warming up progressed, plants requiring a damp and cool environment failed to survive in the territory surrounding the gorge.

SIGNIFICANT PLANTS OF THE AREA

The species listed below seem to be noteworthy, judging from published ranges available to me — chiefly those of the 8th edition of Gray's Manual, which, except where otherwise indicated, is the basis for remarks on ranges. The nomenclature used follows that of the Manual. Specimens of all of the plants mentioned have been collected by me, unless otherwise indicated, and are deposited in the herbarium of the New York State Museum in Albany, N. Y.

High Northern

Bryum Muhlenbeckii. This moss, of circumpolar distribution, has previously been reported in the northeastern U. S. only from northern parts of New York and New England.[1]

Myurella julacea. Grout describes this species as a "subalpine moss, south to Conn." Ketchledge collected both of these mosses on the gorge. He also reports the Myurella from northern New York.[2]

Lycopodium Selago, var. patens. Only three or four plants of this clubmoss were found in the gorge growing on rocks close to the creek. This boreal species occurs in the Catskill Mountains in Greene Co., about 25 miles away, and recently I found a large stand of it in the Shawangunk Mts. about 15 miles south of the study area.

Woodsia alpina. This fern of "arctic regions", has not previously been reported from New York State south of Essex Co. in the northern Adirondacks,[3] but it has been recorded from both northern Vt. and Me. About 25 plants were found scattered along a northeast-facing cliff.

Cryptogramma Stelleri. A circumboreal species, reaching locally in northeastern North America into Penn. and N. J. In New York State

[1] Grout, A. J. Moss Flora of North America. Vol. 11. p. 234.

[2] Ketchledge, Edwin H. Checklist of Mosses of New York State. New York State Museum Bulletin number 363.

[3] Map files of the Botany Office, New York State Museum, Albany, N. Y.

there are four known stations in Greene Co. and one in Delaware Co. Thus this station becomes the southernmost one reported in the state.

SEDUM ROSEA. The occurrence of this plant in the gorge is the fifth New York station. Usually growing in arctic regions, it has been found in Madison, Yates, Greene and Schuyler Cos., N. Y. It has also been collected in northeastern Penn. and on Roan Mountain in North Carolina. Uhl has reported 11 gametic chromosomes in plants from the Esopus Gorge.[4]

ACHILLEA BOREALIS. (*A. Millifolium* L. var. *nigrescens* E. Mey.) Identified by S. J. Smith who believes that it should be given varietal status, following the treatment of Cronquist in the Britton and Brown Illustrated Flora. According to Smith, these specimens are identical with those found in some of the Adirondack gorges, near Elmira and in the Delaware Water Gap.

CANADIAN ZONE

The following plants exhibit more or less isolated extensions of range from the cooler valleys of the Catskills.

POLYSTICHUM BRAUNII. This fern common in the Catskills at elevations from 1500 to 2200 feet, is rare at other altitudes. One plant was observed on a wet, north-facing cliff. It was subsequently washed away during a flood and hence was not collected.

PICEA RUBENS AND ABIES BALSAMEA. Three or four depauperate specimens of each were found on the wooded slopes. Abundant stands of both occur in the Catskills above 3500 ft. some 15 or 20 miles to the west.

TRISETUM SPICATUM var. MOLLE. This grass was collected in the gorge by S. J. Smith.

EPILOBIUM CILIATUM. Smith identified this species also growing in the same area.

LOBELIA KALMII. Fernald reports this plant as growing from Newfoundland to central Maine, northern New Jersey and southeastern Pennsylvania. Here it occurs in several locations on wet cliffs.

The following might be designated as Appalachian rather than Canadian.

ILEX MONTANA. But one (male) plant has been found in the area.

VIOLA ROTUNDIFOLIA. This violet occurs sparsely in moist, shady ravines.

VIBURNUM ALNIFOLIUM. This shrub, growing in similar places to the violet, is even more scarce.

SOUTHERN

The following plants suggest that they may have moved into this

[4] Heteroploidy in Sedum Rosea (L) Scop. Evolution *6:* 81–86. 1952.

area as the climate warmed up. It is true that in each case there are instances of their occurrence even further north, but they are scarcely expected to be found associated with those listed above and are offered as possible evidence of post-glacial northward migration.

CORALLORHIZA ODONTORHIZA. The range for this orchid is from southwestern Maine to Georgia and Alabama.

TEPHROSIA VIRGINIANA. This species is recorded from Florida north to southern New Hampshire.

GALIUM PILOSUM. This bedstraw occurs in the Finger Lakes region of New York and sparsely in the Hudson Valley, but is not reported from the mountain regions of New York State.[3]

SOLIDAGO ODORA. With a distribution much like that of the Tephrosia, this plant is equally unexpected in the gorge.

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PLANTS NEW TO ILLINOIS AND TO THE CHICAGO REGION

JULIAN A. STEYERMARK AND FLOYD A. SWINK

Since the last publication by the authors and Dr. Thieret[1], the following new records have come to light. All specimens are deposited in the herbarium of the Chicago Natural History Museum.

PLANTS NEW TO ILLINOIS

BUTOMUS UMBELLATUS L. This species was found growing spontaneously and aggressively spreading in a small pond south of 87th Street and east of Kean Avenue near Buffalo Woods Forest Preserve, Cook Co., Aug. 6, 1957, *Swink 3007*.

BETULA PUMILA L. var. GLABRA Regel. This variety is not given for Illinois in the 8th Edition of Gray's Manual. The following collection belongs to this variety: Low mound in swale, north of Waukegan, Lake Co., June 8, 1908, *Frank C. Gates 2500*.

PODOPHYLLUM PELTATUM L. f. DEAMII Raymond. This color form of